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European Patent Office
Office européen des brevets



(11) Publication number:

0 293 187 B1

(2)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: 20.01.93 (51) Int. Cl. 5: **B32B 27/32**

(21) Application number: **88304745.8**

(22) Date of filing: **25.05.88**

(54) Laminated film having poly(4-methyl-1-pentene) base layer.

(33) Priority: 28.05.87 JP 130012/87

(43) Date of publication of application:
30.11.88 Bulletin 88/48

(45) Publication of the grant of the patent:
20.01.93 Bulletin 93/03

(61) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(56) References cited:

Derwent Abstract no. 86-079553

PATENT ABSTRACTS OF JAPAN, unexamined applications, C field, vol. 10, no. 13, January 18, 1986 THE PATENT OFFICE JAPANESE GOVERNMENT page 11 C 323

Derwent abstract no. 80-85103

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Description**BACKGROUND OF THE INVENTION**5 **1. Field of the Invention**

The present invention relates to a laminated film having a high heat-sealability and comprising a substrate of poly(1-methyl-1-pentene).

10 **2. Description of the Related Art**

The good transparency, heat resistance, chemical resistance and the like, of poly(4-methyl-1-pentene) have led to the application thereof to laboratory ware such as beakers or graduated cylinders, syringes, cells for optical measurement, trays for microwave ovens, and a baking carton comprising a paper coated therewith, etc. But although poly(4-methyl-1-pentene) has a high melting point and a good heat resistance, it has a disadvantage in that it has a poor heat-sealability. The most general used method for improving this heat-sealability is by lamination of the poly(4-methyl-1-pentene) with a resin such as polyethylene or polypropylene having a good heat-sealability and a lower melting point. But, poly(4-methyl-1-pentene) and polyethylene or polypropylene do not adhere to each other, although they are both a polyolefin, and thus a product prepared by laminating these elements cannot be practically employed.

Further, if the poly(4-methyl-1-pentene) film is laminated with a polyethylene film by applying an adhesive based on a urethane as an anchor coating agent, the heat-sealability is not greatly improved because the poly(4-methyl-1-pentene) film has a poor surface-wettability, and thus the resulting laminated film has a low adhesive strength.

25 The assignee of the present application has already filed Japanese Patent Application No. 59-1387 (Unexamined Publication No. 60-145844) which discloses that a laminated film having an improved adhesive strength and a high heat-sealability can be obtained by employing a particular random copolymer of propylene and α -olefin as an adhesive layer for the lamination of poly(4-methyl-1-pentene) film and a polyethylene or polypropylene film.

30 **SUMMARY OF THE INVENTION**

The present inventor has now found that an adhesive strength of a laminated film comprising a poly(4-methyl-1-pentene) base layer can be further improved by employing a particular α -olefin copolymer as disclosed in Japanese Unexamined Patent publication No. 60-166310 filed by the same assignee as for the present application, as an adhesive layer.

Accordingly, the object of the present invention is to provide an improved laminated film which comprises

- (A) a base layer of a polymer based on 4-methyl-1-pentene;
- 40 (B) an interlayer of an α -olefin copolymer comprising 10 - 85 mole% of propylene, 3 - 60 mole% of 1-butene and 10 - 85 mole% of α -olefin having 5 or more carbon atoms, a degree of crystallinity of the copolymer, as measured by X-ray diffractometry, being 20% or less, provided on at least one side of the base layer; and
- (C) a heat-sealable layer of an α -olefin polymer material predominantly comprising an α -olefin having 2 to 4 carbon atoms provided on the interlayer.

45 Other objects and advantages of the present invention will be apparent from the following description.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

50 As the polymer constituting the base layer (A), there may be employed a homopolymer of 4-methyl-1-pentene, or a copolymer generally comprising 85 mole% or more of 4-methyl-1-pentene and 15 mole% or less of other α -olefins having 2 to 20 carbon atoms such as ethylene, propylene, 1-butene, 1-hexene, 1-octene, 1-decene, 1-tetradecene, 1-octadecene, or the like; the melt flow rate [MFR_s; load 5 kg; 260°C] of the polymer based on 4-methyl-1-pentene preferably ranging from 0.5 to 200 g/10 min. The polymer having a melt flow rate of less than 0.5 g/10 min has a high melt viscosity, and thus a poor moldability, whereas a polymer having a melt flow rate of more than 200 g/10 min has a low melt viscosity, and thus a poor moldability and a low mechanical strength.

The α -olefin copolymer constituting the interlayer (B) comprises 10 - 85 mole%, preferably 15 - 70

mole%, more preferably 25 - 55 mole%, of propylene, 3 - 60 mole%, preferably 5 - 50 mole%, more preferably 10 - 40 mole%, of 1-butene and 10 - 85 mole%, preferably 15 - 70 mole%, more preferably 20 - 60 mole%, of α -olefin having 5 or more, preferably 6 - 12, carbon atoms, and a degree of crystallinity of the copolymer as measured by X-ray diffractometry of 20% or less, preferably 15% or less, more preferably 5 10% or less. As an example of the α -olefin having 5 or more carbon atoms, there may be mentioned 1-pentene, 3-methyl-1-butene, 1-hexene, 4-methyl-1-pentene, 3-methyl-1-pentene, 1-heptene, 1-octene, 1-decene, 1-dodecene, or the like.

When the content of propylene is less than 10 mole% or more than 85 mole%, that of 1-butene is less than 3 mole% or more than 60 mole%, or that of the α -olefin is less than 10 mole% or more than 85 mole% 10 in the α -olefin copolymer, the adhesive strength to the base layer (A) is weakened. Further, the α -olefin copolymer having a degree of crystallinity as measured by X-ray diffractometry of more than 20% has a low adhesiveness to the base layer (A).

In the present invention, the degree of crystallinity of the α -olefin copolymer as measured by X-ray diffractometry is determined as follows:

15 A sample is compression-molded for 10 minutes under a condition of 30 kg/cm² at 280°C, cooled for 5 minutes in a water-cooled press (pressure: 30 kg/cm²) at 23°C, and then a specimen (2 cm x 4 cm x 1 mm) is molded. An X-ray diffraction curve of the specimen is measured at 5° - 31° of the diffraction angle (2 θ) with X-ray diffractometer equipped with a rotating anode and a copper target (RU-300; Rigaku Denki K.K.).

20 Non-crystalline and crystalline portions are divided by drawing a base line between 6° and 30°, and the crystalline portion is determined by a percentage by weight.

The α -olefin copolymer constituting the interlayer (B) used in the present invention has an intrinsic viscosity [η] (measured at 135°C in decalin) of 0.5 to 6 dl/g, preferably 0.6 to 5 dl/g, more preferably 1.0 to 4 dl/g. An α -olefin copolymer having an intrinsic viscosity outside of that scope may exhibit a low 25 moldability.

Regarding the α -olefin copolymer of the interlayer (B), preferably the matter insoluble in the boiling n-heptane is 5.0% by weight or less and the matter soluble in acetone at 25°C is 5.0% by weight or less. More preferably, the matter insoluble in boiling n-heptane is 4.0% by weight or less, and the matter soluble 30 in acetone at 25°C is 2.5% by weight. When the matter insoluble in boiling n-heptane is more than 5% by weight, the transparency of the α -olefin copolymer is reduced, or a defect such as a fish-eye can appear in a film cast therefrom. When the matter soluble in acetone is more than 3.0% by weight, the surface of the copolymer film becomes tacky, and thus the adhesive to the base layer (A) is reduced.

In the present invention, the matter insoluble in boiling n-heptane and the matter soluble in acetone at 25°C with respect to the α -olefin copolymer are determined as follows:

35 The matter insoluble in n-heptane is determined by introducing a small specimen (about 1 mm x 1 mm x 1 mm) with glass beads in a cylindrical glass filter and extracting for 14 hours in a Soxhlet apparatus. The percentage by weight of the insoluble matter is calculated after weighing the soluble or insoluble part.

The matter soluble in acetone at 25°C is determined by dissolving 15 g of the sample in 250 ml of n-decane at 130°C, pouring the resulting solution into 500 ml of acetone, precipitating a polymer insoluble in 40 acetone, recovering a filtrate by filtration, adding 300 ml of water to the filtrate, separating a n-decane layer from a water-acetone layer by a separating funnel, and concentrating the n-decane layer.

The α -olefin copolymer of the interlayer (B), which has the above properties and can be used in the present invention, can be prepared from random copolymerization of propylene, 1-butene, and α -olefin by using a catalyst comprising

45 (i) a solid titanium catalyst component prepared by treating (a) a high active solid titanium catalyst component comprising a magnesium compound, a titanium compound and an electron donor with (b) a halogenated hydrocarbon,

(ii) an organic aluminium compound component, and

50 (iii) an electron donor component comprising a silicon compound. The process for manufacturing this catalyst is described in, for example, Japanese Unexamined Patent Publication No. 56-811 and No. 58-83006, the disclosures of which are incorporated herein by reference. Further, the polymerization conditions of the α -olefin copolymer of the interlayer (B) is described in, for example, Japanese Unexamined Patent Publication No. 60-166310; the disclosure of which is incorporated herein by reference.

55 The α -olefin polymer material constituting the heat-sealable layer (C) may be a crystalline polymer predominantly comprising ethylene, propylene or 1-butene. More particularly, the α -olefin polymer material may be a homopolymer of ethylene, propylene or 1-butene; a copolymer of ethylene, propylene or 1-butene with a minor component of other α -olefin having 2 - 20 carbon atoms or vinyl compound such as vinyl

acetate, vinyl chloride, acrylic acid, methacrylic acid or styrene; a graft copolymer thereof modified with an unsaturated carboxylic acid or a derivative thereof such as maleic anhydride, maleic acid or acrylic acid; or a mixture thereof.

5 Polyethylenes as an example of the α -olefin polymer material include high-pressure low density polyethylene (so-called LDPE), ethylene/propylene copolymer, ethylene/1-butene copolymer, ethylene/4-methyl-1-pentene copolymer, ethylene/1-hexene copolymer, high density polyethylene (so-called HDPE), ethylene/vinyl acetate copolymer, ethylene/acrylic acid copolymer and the like. Because of their good transparency and heat-sealability at a low temperature LDPE, ethylene/ α -olefin copolymers, and ethylene/vinyl acetate copolymer are preferable. Among the above polyethylenes, those having a density of 10 0.910 - 0.960 and a melting point (Tm: ASTM D3418) of 100 to 135°C are particularly preferable. Further, the melt flow rate thereof (MFR₃: ASTM D1238, E) is not limited, although it is preferably 0.01 to 30 g/10 min, more preferably 0.1 to 10 g/10 min, in view of the moldability thereof.

15 As an example of the α -olefin polymer material, polypropylenes including: polypropylene (propylene homopolymer); propylene random copolymers comprising generally 90 mole% or more, preferably 95 mole% or more of propylene, for example, propylene/ethylene random copolymer, propylene/ethylene/1-butene random copolymer, propylene/ethylene/1-butene random copolymer, or propylene/1-butene random copolymer; or propylene/ethylene block copolymers comprising generally 5 - 30 mole% of ethylene are 20 preferable. Due to their good transparency, homopolymer and random copolymer are preferable. Particularly, a random copolymer having a melting point (Tm: ASTM D3418) of 130 to 140°C is preferably, in view of a good heat-sealability. The melt flow rate thereof is not limited, although it is preferably 0.5 to 30 g/10 min, more preferably 0.5 to 10 g/10 min, in view of the moldability thereof.

25 As an example of the α -olefin polymer material, poly 1-butenes including: homopolymers of 1-butene, 1-butene/ethylene copolymers, 1-butene/propylene copolymers, or 1-butene/4-methyl-1-pentene copolymers are preferable. The melt flow rate thereof (MFR₃: ASTM D1238, E) is not limited, although it is preferably 0.01 to 100 g/10 min, more preferably 0.03 to 30 g/10 min, in view of the moldability thereof.

The laminated film of the present invention comprises the base layer (A) of the polymer based on 4-methyl-1-pentene; the interlayer (B) of the α -olefin copolymer provided on at least one side of the base layer (A); and the heat-sealable layer (C) of the α -olefin polymer material provided on the interlayer (B).

30 The laminated film according to the present invention may be produced by various known methods; for example, a method comprising previously molding the film of the polymer based on 4-methyl-1-pentene, and thereafter, extrusion-coating the α -olefin copolymer and the α -olefin polymer material thereon; a method comprising previously molding the film of the polymer based on 4-methyl-1-pentene, and thereafter, extrusion-laminating the α -olefin copolymer with the film of the α -olefin polymer material; or a method comprising coextruding the polymer based on 4-methyl-1-pentene, the α -olefin copolymer and the α -olefin 35 polymer material through a multilayer die having a multilayer structure (at least three layers) with the α -olefin copolymer being the interlayer. The coextrusion method is preferable because the operation is simple and a laminated film having a good adhesiveness between layers can be produced. Two typical coextrusion methods are known; namely, a T-die method using a flat die, and an inflation method using a circular die. As the flat die, either a single-manifold type using a black box or a multimanifold type may be used, and 40 any known die may be used in the inflation die.

The thickness of each layer in the laminated film according to the present invention is not limited. Although the base layer (A) preferably has a thickness of 10 - 100 μm , more preferably 10 - 50 μm , the interlayer (B) preferably has a thickness of 5 - 50 μm , more preferably 10 - 30 μm and the heat-sealable layer (C) preferably has a thickness of 10 - 100 μm , more preferably 10 - 50 μm .

45 Any laminated film having the base layer (A) of the polymer based on 4-methyl-1-pentene, the interlayer (B) of the α -olefin copolymer and the heat-sealable layer (C) of the α -olefin polymer material is encompassed in the scope of the present invention, and therefore, the laminated film according to the present invention includes a film comprising the base layer (A) carrying, on both sides thereof, the heat-sealable layers (C) via the interlayers (B). Further, the laminated film according to the present invention may further carry thereon a gas barrier layer comprising a resin based on polyvinylidene chloride; polyvinyl alcohol; saponified copolymer of ethylene/vinyl acetate; polyamide; polyester; paper; or aluminium foil or the like.

50 In all of the base layer (A), the interlayer (B), and the heat-sealable layer (C), constituting the laminated film of the present invention, various additives usually employed in a polyolefin, such as a weathering agent, heat stabilizer, antistatic agent, antifogging agent, antiblocking agent, slip agent, lubricant, pigment, dyestuff, antisticking agent, nucleating agent or the like, can be incorporated, so long as such incorporation has not affect the purpose of the present invention. In the heat-sealable layer (C), an ethylene/ α -olefin copolymer such as ethylene/propylene copolymer or ethylene/1-butene copolymer, or ethylene/vinyl acetate copolymer, etc. which has a little or no crystallizing property may be incorporated to improve the heat-

sealability.

Because the laminated film according to the present invention has not only a good heat resistance, transparency, surface gloss, water repellency and the like due to poly(4-methyl-1-pentene), but also an improved heat-sealability, it is preferable for use as a wrapping material for various foods such as vegetables, confectionery, meat, bread, or sea food.

EXAMPLES

The present invention now will be further illustrated by, but is by no means limited to, the following Examples.

Example 1

4-methyl-1-pentene/1-decene copolymer [density: 0.835 g/cm³, MFR₅: 26 g/10 min] (referred to hereinafter as "MP-I"), propylene/1-butene/4-methyl-1-pentene [propylene content: 36 mole%, 1-butene content: 14 mole%, 4-methyl-1-pentene content: 50 mole%, glass transition temperature (Tg): 5°C, density (D): 0.860 g/cm³, MFR: 0.88 g/10 min, degree of crystallinity measured by X-ray: 1.2%] (referred to hereinafter as "PBM-I"), and high-pressure polyethylene [melting point (Tm): 105°C] (referred to hereinafter as "LDPE-I") were melted in 40 mmφ extruder (cylinder temperature: 270°C), 40 mmφ extruder (cylinder temperature: 250°C) and 40 mmφ extruder (cylinder temperature: 250°C), respectively, extruded through a coathanger die (die temperature: 260°C) of three-layer T-die film extruder with the PBM-I as the interlayer, and cooled to obtain a coextruded three-layer film having 30 μm of MP-I, 20 μm of PBM-I and 30 μm of LDPE-I. The properties thereof were evaluated by the following methods:

25 Adhesive Strength (g/15 mm)

A specimen (width: 15 mm) was cut, and a crosshead speed of up to 200 mm/min for peeling was applied to two layers. The strength recorded is the speed at which the layers were peeled.

30 Peel Strength of Heat-Sealed Portion (g/15 mm)

A laminated film was put on the other laminated film in such a way that the heat-sealable layers (C) thereof were brought into contact with each other. Heat-sealing was carried out for 1 second at 120°C or 170°C under a pressure of 2 kg/cm² with a silver bar (width: 10 mm) and the whole was allowed to cool. A specimen (width: 15 mm) was cut, and a crosshead speed of up to 200 mm/min for peeling was applied to the heat-sealed portion. The strength recorded is the speed at which the portion was peeled.

The result is shown in Table 1.

Example 2

The procedure of the above Example 1 was repeated, except that propylene/1-butene/4-methyl-1-pentene copolymer [propylene content: 46 mole%, 1-butene content: 18 mole%, 4-methyl-1-pentene content: 36 mole%, glass transition temperature (Tg): 23°C, density (D): 0.847 g/cm³, MFR: 1.2 g/10 min, degree of crystallinity measured by X-ray: 4.3%] (referred to hereinafter as "PBM-II") was used instead of PBM-I as the interlayer. The result is shown in Table 1.

Example 3

The procedure of the above Example 1 was repeated, except that propylene/1-butene/4-methyl-1-pentene copolymer [propylene content: 44 mole%, 1-butene content: 28 mole%, 4-methyl-1-pentene content: 28 mole%, glass transition temperature (Tg): 170°C, density (D): 0.851 g/cm³, MFR: 1.5 g/10 min, degree of crystallinity measured by X-ray: 3.3%] (referred to hereinafter as "PBM-III") was used instead of PBM-I as the interlayer. The result is shown in Table 1.

55 Example 4

The procedure of the above Example 1 was repeated, except that propylene/ethylene random copolymer [density: 0.91 g/cm³, MFR: 5 g/10 min, and Tm: 140°C] (referred to hereinafter as "PP-I") was

used instead of "LDPE-I", and the cylinder temperature of the extruder for "PP-I" was 270°C. The result is shown in Table 1.

Comparative Example 1

The procedure of the above Example 1 was repeated, except that propylene/1-butene random copolymer [propylene content: 71 mole%, melting point: 110°C, and MFR: 7.0 g/10 min] (referred to hereinafter as "PBR-I") was used instead of "PBM-I" as the interlayer. The results are shown in Table 1.

Table 1

Example	Construction (thickness: µm)			Adhesive strength (g/15 mm)	Peel strength of heat sealed portion 1)		
	Outer layer	Inter- layer	Inside layer		Interlayer/ inside layer	120°C	170°C
1	MP-I / PBM-I (30) (20)	/ LDPE-I (30)	not peeled	"	"	2300	N.D. 2)
2	MP-I / PBM-II (30) (20)	/ LDPE-I (30)	"	"	"	2200	"
3	MP-I / PBM-III / LDPE-I (30) (20) (30)	"	"	"	"	2100	"
4	MP-I / PBM-I / PP-I (30) (20) (30)	"	"	"	"	N.D. 2)	2600
Comparative Example 1	MP-I / PBR-I (30) (20)	/ LDPE-I (30)	160 g	"	"	900	N.D. 2)

1) ... Inside layers of two films were heat-sealed.

2) ... not determined

Claims

55 1. A laminated film comprising

- (A) a base layer of a polymer based on 4-methyl-1-pentene;
- (B) provided on at least one side of the base layer, an interlayer of an α -olefin copolymer comprising 10 - 85 mole% of propylene, 3 - 60 mole% of 1-butene and 10 - 85 mole% of an α -olefin having 5

or more carbon atoms, the degree of crystallinity of the copolymer as measured by X-ray diffractometry being at most 20%; and
(C) provided on the interlayer, a heat-sealable layer of an α -olefin polymer material predominantly comprising an α -olefin having 2 to 4 carbon atoms.

- 5 2. A laminated film according to claim 1, wherein the polymer constituting the base layer comprises at least 85 mole% of 4-methyl-1-pentene and at most 15 mole% of another α -olefin having 2 to 20 carbon atoms.
- 10 3. A laminated film according to claim 1 or 2, wherein the interlayer serves as an adhesive layer between the base layer and the heat-sealable layer.
- 15 4. A laminated film according to claim 1, 2 or 3, wherein the α -olefin copolymer constituting the interlayer comprises 15 - 70 mole% of propylene, 5 - 50 mole% of 1-butene and 15 - 70 mole% of an α -olefin having 5 or more carbon atoms, the degree of crystallinity thereof being at most 15%.
- 20 5. A laminated film according to any one of claims 1 to 4, wherein the α -olefin having 5 or more carbon atoms is selected from 1-pentene, 3-methyl-1-butene, 1-hexene, 4-methyl-1-pentene, 3-methyl-1-pentene, 1-heptene, 1-octene, 1-decene and 1-dodecene.
- 25 6. A laminated film according to any one of claims 1 to 5, wherein the α -olefin polymer material constituting the heat-sealable layer is at least one polymer material selected from a homopolymer of ethylene, propylene or 1-butene; a copolymer of ethylene, propylene or 1-butene with a minor component of another α -olefin having 2 - 20 carbon atoms or a vinyl compound; and a graft copolymer thereof modified with an unsaturated carboxylic acid or a derivative thereof.
- 30 7. A laminated film according to any one of the preceding claims, further comprising a gas barrier layer.
- 35 8. A laminated film according to any one of the preceding claims, wherein the base layer carries, on both sides thereof, a heat-sealable layer coated on an interlayer.
- 40 9. Use of a laminated film as claimed in any one of the preceding claims in the preparation of a packaged article by wrapping an article in a said film and heat-sealing the heat-sealable layer (C).

35 Patentansprüche

1. Verbundfolie, welche umfaßt:
 - (A) eine Grundschicht aus einem Polymer, das auf 4-Methyl-1-penten basiert;
 - (B) eine auf zumindest einer Seite der Grundschicht vorgesehene Zwischenschicht aus einem α -Olefin-Copolymer, das 10 bis 85 Mol-% Propylen, 3 bis 60 Mol-% 1-Buten und 10 bis 85 Mol-% eines α -Olefins mit 5 oder mehr Kohlenstoffatomen umfaßt, wobei der durch Röntgenbeugung gemessene Kristallinitätsgrad des Copolymers höchstens 20% beträgt; und
 - (C) eine auf der Zwischenschicht vorgesehene heißsiegelfähige Schicht eines α -Olefin-Polymermaterials, das vorwiegend ein α -Olefin mit 2 bis 4 Kohlenstoffatomen umfaßt.
- 45 2. Verbundfolie nach Anspruch 1, worin das die Grundschicht bildende Polymer mindestens 85 Mol-% 4-Methyl-1-penten und höchstens 15 Mol-% eines anderen α -Olefins mit 2 bis 20 Kohlenstoffatomen umfaßt.
- 50 3. Verbundfolie nach Anspruch 1 oder 2, worin die Zwischenschicht als Klebemittelschicht zwischen der Grundschicht und der heißsiegelfähigen Schicht dient.
- 55 4. Verbundfolie nach Anspruch 1, 2 oder 3, worin das α -Olefin-Copolymer, das die Zwischenschicht bildet, 15 bis 70 Mol-% Propylen, 5 bis 50 Mol-% 1-Buten und 15 bis 70 Mol-% eines α -Olefins mit 5 oder mehr Kohlenstoffatomen umfaßt, wobei dessen Kristallinität höchstens 15% beträgt.
- 60 5. Verbundfolie nach einem der Ansprüche 1 bis 4, worin das α -Olefin mit 5 oder mehr Kohlenstoffatomen aus 1-Penten, 3-Methyl-1-butene, 1-Hexen, 4-Methyl-1-penten, 3-Methyl-1-penten, 1-Hepten, 1-Octen, 1-

Decen und 1-Dodecen ausgewählt ist.

6. Verbundfolie nach einem der Ansprüche 1 bis 5, worin das α -Olefin-Polymermaterial, das die heißsiegelfähige Schicht bildet, zumindest ein Polymermaterial ist, das aus einem Homopolymer von Ethylen, Propylen oder 1-Buten; einem Copolymer von Ethylen, Propylen oder 1-Buten mit einer geringfügigen Komponente eines anderen α -Olefins mit 2 bis 20 Kohlenstoffatomen oder einer Vinylverbindung; und einem Propfcopolymer davon ausgewählt ist, das mit einer ungesättigten Carbonsäure oder einem Derivat davon modifiziert ist.
- 10 7. Verbundfolie nach einem der vorstehenden Ansprüche, die außerdem eine Gassperrsicht umfaßt.
8. Verbundfolie nach einem der vorstehenden Ansprüche, worin die Grundsicht auf beiden Seiten eine auf die Zwischenschicht aufgebrachte heißsiegelfähige Schicht trägt.
- 15 9. Verwendung der Verbundfolie nach einem der vorstehenden Ansprüche bei der Herstellung eines verpackten Gegenstandes durch Einwickeln dieses Gegenstandes in der Folie und Heißsiegen der heißsiegelfähigen Schicht (C).

Revendications

- 20 1. Film laminé comprenant
 - (A) une couche de base d'un polymère à base de 4-méthyl-1-pentène;
 - (B) muni sur au moins un côté de la couche de base, d'une intercouche d'un copolymère d'alphaoléfine comprenant 10-85% molaire de propylène, 3-60% molaire de 1-butène et 10-85% molaire d'une alphaoléfine ayant 5 atomes de carbone ou plus, le degré de cristallinité du copolymère mesuré par diffractométrie aux rayons X étant d'au plus 20%; et
 - (C) muni sur l'intercouche, d'une couche, scellable à la chaleur, d'un polymère d'alphaoléfine comprenant de façon prédominante une alphaoléfine ayant de 2 à 4 atomes de carbone.
- 30 2. Film laminé selon la revendication 1, dans lequel le polymère constituant la couche de base comprend au moins 85% molaire de 4-méthyl-1-pentène et au plus 15% molaire d'une autre alpha-oléfine ayant de 2 à 20 atomes de carbone.
- 35 3. Film laminé selon la revendication 1 ou 2, dans lequel l'intercouche sert de couche adhésive entre la couche de base et la couche scellable à la chaleur.
- 40 4. Film laminé selon la revendication 1, 2 ou 3, dans lequel le copolymère d'alpha-oléfine constituant l'intercouche comprend 15-70% molaire de propylène, 5-50% molaire de 1-butène et 15-70% molaire d'une alphaoléfine ayant 5 atomes de carbone ou plus, son degré de cristallinité étant d'au plus 15%.
- 45 5. Film laminé selon l'une quelconque des revendications 1 à 4, dans lequel l'alpha-oléfine ayant 5 atomes de carbone ou plus est choisie parmi le 1-pentène, le 3-méthyl-1-butène, le 1-hexène, le 4-méthyl-1-pentene, le 3-méthyl-1-pentène, le 1-heptène, le 1-octène, le 1-décène et le 1-dodécène.
- 50 6. Film laminé selon l'une quelconque des revendications 1 à 5, dans lequel le polymère d'alphaoléfine constituant la couche scellable à la chaleur est au moins un polymère choisi parmi un homopolymère d'éthylène, de propylène ou de 1-butène; un copolymère d'éthylène, de propylène ou de 1-butène avec un composant mineur d'une autre alpha-oléfine ayant de 2 à 20 atomes de carbone ou d'un composé de vinyle; et un copolymère greffé de ces composés modifié avec un acide carboxylique non saturé ou un de ses dérivés.
7. Film laminé selon l'une quelconque des revendications précédentes, comprenant en outre une couche faisant barrière aux gaz.
- 55 8. Film laminé selon l'une quelconque des revendications précédentes, dans lequel la couche de base porte, sur ses deux côtés, une couche scellable à la chaleur déposée sur une intercouche.
9. Application d'un film laminé selon l'une quelconque des revendications précédentes à la préparation

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d'un article conditionné par enveloppement d'un article dans un film de ce type et scellement à la chaleur de la couche scellable à la chaleur (C).

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